

Homo sapiens, All Too Homo sapiens: Wise Man, All Too Human

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Outside of Carlsbad, New Mexico, a mere three hundred miles from the University of New Mexico where I teach, is the Waste Isolation Pilot Plant (WIPP). This deep, geologic storehouse will entomb nuclear weapons waste for the next 10,000 years. The transuranic elements—elements with an atomic number of 92, uranium, or higher—are unstable and radioactive, and they decay at a half-life rate that makes them dangerous environmental contaminants. During the planning phase of the WIPP's construction, the Department of Energy hired archaeologists, historians, linguists, materials scientists, and science fiction writers to address questions such as the one paraphrased here: How should we communicate radioactive danger to Earth-dwellers after five hundred generations of linguistic variation? (Piller). How can we communicate that this repository is not a monument filled with treasure to the Cyborg Indiana Jones who may come a thousand years hence?

They drew plans for a field of twenty-five-foot tall granite pillars surrounding a roofless granite room positioned above the waste site. At the heart of this ominous landscape, a wanderer would find warnings and more information.

A section of it reads: “We considered ourselves to be a powerful culture. This is not a place of honor. . . . Nothing valued is here. . . . The danger is still present in your time, as it was in ours. . . . This place is best shunned and uninhabited” (Trauth, Hera, and Guzowsti, 139).

I mention the WIPP because, essentially, this government team was collaboratively writing a speculative fiction; to do so, they had to perform research, create elaborate scenarios of events that may or may not happen, and then develop strategies to cope with them. They brought together a team of experts from different fields to consider human curiosity and cross-cultural and -temporal communication. This team might sound a lot like the students in your honors seminar, and the project requires the kind of creative, interdisciplinary thinking that is present in a humanities-based honors education. This kind of education is what students need to begin solving the many serious problems we face today, including climate change, Ebola, and of course, the half-life of transuranic waste.

The emphasis on STEM education should not be interpreted as an omen of the death of humanities; art, literature, history, and philosophy can inform and enlighten STEM studies if the walls of academic silos are broken down and taught in combination. As the famous essayist and humanist Michel de Montaigne said:

A tutor must demand an account not just of the words of his lesson, but of their meaning and substance, and must judge of its benefit to his pupil by the evidence not of the lad's memory but of his life. He must make him consider what he has just learnt from a hundred points of view and apply it to as many different subjects. . . . (55)

Where the physical universe collides with the fanciful and flawed human experience of life, there is creative energy, be it in scientific research or creative writing. Both are meant to birth new knowledge, rouse questions, explore our relationship with the world, employ the senses, test ideas, and better our understanding of life and the human experience. The humanities can easily combine with other disciplines through applied speculation.

A strategy to combine might be, for instance, to adapt the writing core to an interdisciplinary, experiential course that uses science as the lens through which students analyze and apply literary devices. Many fine examples of creative writing use science as a way to access the personal, bizarre, and blemished experience of living. For instance, Lydia Millet's *Love in Infant Monkeys* is a collection of short stories that investigate the connection between the human

and animal worlds, often through famous researchers and their encounters with laboratory animals.

Emulating these works, students communicate information, conflict, and awe of scientific endeavors. They learn to understand the diction of science, integrate concepts and theories as metaphors, and recreate the conflict and climactic potential in the research process. Students unfamiliar with scientific research can realize that it is more than Bunsen burners and bubbling flasks, swiveling CGI DNA on computer monitors, or fruit flies mutating in swarms. They also learn that the settings of research may include archaeological sites, microwave laboratories, or *JAMA*'s archives, but more often than not the setting is a computer program logging and crunching data. Creating short stories based on scientific articles, they practice reading and understanding articles, conveying complex ideas, building conclusions in a way similar to a literature review, and extrapolating information to imagine implications.

Just as young humanists can benefit from developing a greater understanding of science, so too can young scientists benefit from applying communications to science. The former honors student Carl Sagan once said, "Science is much more than a body of knowledge. It is a way of thinking." Typically, underclassmen have not yet been presented with the opportunity to explore science as a way of thinking. When students are only used to the generalization of knowledge—to broad theories and scaffolds of equations without the humanistic foundation of science education—the idea of specializing in the sexual selection of wild radishes is perplexing and exasperating. They have had neither the opportunity to embrace the scientific mysticism that we associate with gaining new knowledge—"Eureka!" cried Archimedes—nor the daily toil of observation, entering data, computing, or cleaning the laboratory; instead, their courses at the lower levels have focused on memorization of facts, solving known problems, and stratified, sequential rehearsal. At the same time underclassmen are being introduced to the terms, conventions, and methods that they will apply during the course of their study, they should be introduced to science as a process of inquiry, couched in uncertainty, where unknowns exist.

At a writing conference last year, the poet H. L. Hix gave a presentation on Einstein's thought experiments as a kind of flash fiction. Hix asserted that Einstein was able to get colleagues and the general population to accept and understand aspects of theoretical physics by tapping into the power of narrative. Einstein gave examples such as this one: if you're riding in the dining car of a train going the speed of light, and you drop a matchbook with a phone

number on it, then it falls to Earth in a parabolic curve. Hix points out that Einstein's situation is fictional; these fictions illuminate assumptions that may be contrary to our lived experience. He uses narrative to unfurl his argument: because we are trained to understand how narrative consequences work, we understand how the science works. Something false has demonstrated something true. The laboratory is similar to, not identical with, the world we live in, so step into the laboratory, sterilize your hands, suspend your disbelief, and create the narrative necessities (controlled conditions, intracellular conflicts) that will allow us to view out existence with greater clarity.

One of the goals of an undergraduate education is to learn a discipline well enough to develop an educated worldview. A student should graduate with a way of understanding and analyzing the phenomena in their life and greater, global habitat. Different disciplines emphasize different ways of looking at the world: as an organism of power relationships, a set of outcomes dependent on historical precedence, a complex of interdependent systems, or the control of information through presentation. The transformation of a student's worldview, however, is difficult to assess. Far easier is checking bubbles on a Scantron sheet, but asking a student to achieve a predetermined correct answer is not the same as asking a student to understand, evaluate, or create something new in this world. I quote Montaigne again:

The bees steal from this flower and that, but afterwards turn their pilferings into honey, which is their own; it is thyme and marjoram no longer. So the pupil will transform and fuse together the passages that he borrows from others, to make of them something entirely his own; that is to say, his own judgment. His education, his labor, and his study have no other aim than to form this.

If we really want our students to be free thinkers instead of just Buzzfeed consumers, we need to continue giving them the interdisciplinary tools associated with the humanities: to be critical and speculative; to know historical connections to the present; to respect cultural differences; to consider the human condition. We need to teach them to develop both the questions and the answers. Soon they will have to be comfortable depositing our transuranic waste in a way that will protect our future selves from untold "what ifs."

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